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Indian Standard

SPECIFICATION FOR TABLEWARE MADE OF MELAMINE PLASTICS

UDC 642·725 : 678·652'737'21

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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SPECIFICATION FOR TABLEWARE MADE OF MELAMINE PLASTICS

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(*Continued on page* 11)

Indian Standard

SPECIFICATION FOR TABLEWARE MADE OF MELAMINE PLASTICS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 June 1979, after the draft finalized by the Plastics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 This standard is expected to provide a suitable level of resistance to breakage and maintenance of quality in normal use of melamine tableware. The test on staining will help the consumer to put the tableware to right use. The gradual build up of surface deposits may cause eventual staining, but such deposits may normally be readily removed by prompt and correct cleaning methods.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard prescribes requirements and methods of sampling and test for tableware such as cups, saucers, plates, bowls, compartmented trays and similar articles, made of melamine plastics.

2. TERMINOLOGY

2.1 For the purpose of this standard the definitions given in IS : 2828-1964† shall apply.

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*Rules for rounding off numerical values (*revised*).

†Glossary of terms used in the plastics industry.

3. REQUIREMENTS

3.1 Raw Materials — The tableware shall be manufactured from alphacellulose filled melamine formaldehyde moulding material (*see* IS : 3669-1966*).

3.1.1 The finished tableware shall contain no constituents that are capable of being extracted by foodstuffs under normal conditions of use, in quantities sufficient to be injurious to health and shall not give any smell or impart any colour when subjected to free boiling in water for 10 minutes.

3.2 Finish — The surface of all tableware shall be representative of that produced by good moulding practice and shall be reasonably free from imperfections such as orange peel, pits, flow lines and contamination. The surface shall not be altered by the application of lacquer, polish or other surface coating. Flash and parting lines only shall be buffed.

3.2.1 *Decorations* — Decorations shall be incorporated in such a manner as to become an integral part of the piece and shall be as durable as the undecorated surface.

3.2.2 The finished tableware shall have rounded edges and shall be clean, well made and free from any visible defects such as spots, bubbles, holes, cracks, impurities and surface scratches.

3.3 Tolerance on Capacity — Where the nominal capacity of the tableware is specified, the actual capacity shall be not less than the nominal, and shall not exceed it by more than 4 percent.

3.4 Thickness — The thickness shall be not less than that specified below and shall be maintained over at least 70 percent of the total area of the tableware:

a) *Vessels with or Without Handles*

Nominal Fluid Capacity ml	*Depth, Min* mm	*Thickness, Min* mm
100	40	2·0
150	40	2·5
250	40	3·0
550	40	4·0

NOTE — For tableware having capacity between those specified above, the thickness shall be determined proportionally.

---

*Specification for melamine formaldehyde moulding materials.

b) *Saucers, Plates, Dishes, Shallow Bowls and Similar Articles*

Nominal Projected Area cm²	*Depth Greater than* mm	*Thickness, Min* mm
50	40	2·0
250	40	2·5
600	40	3·0
800	40	4·0

NOTE — For tableware having area between those specified above, the thickness shall be determined proportionally.

3.4.1 *Handles* — In order to avoid knit lines and similar flaws it is essential that moulded handles shall not constitute extreme changes of section. There shall also be no visible weldline in the moulding. The handles shall have a mean thickness not less than 1·5 times the wall thickness, except where they join the cup, and shall have a cross-sectional area not exceeding 10 t, where t is the wall thickness.

3.4.2 *Lips or Rims* — The tableware may have an internal radius at the lip or rim to give the appearance of a thinner section. The outer edge shall have a radius of not less than 0·8 mm.

3.4.3 In the case of round tableware, the ovalling (difference between the maximum and the minimum diameters) shall not exceed 1 percent in the case of diameters over 75 mm and 2 percent in the case of diameters less than 75 mm.

3.5 Cure Test — The articles shall be tested for curing by either of the tests given in Appendix A.

3.5.1 When tested in accordance with the dye test given in **A-1**, the articles shall show not more than slight staining of the surface except at flash lines.

3.5.2 When tested in accordance with the sulphuric acid test given in **A-2**, the articles shall show no chalking (defined as a dry, chalklike appearance or deposit on the surface).

NOTE — A separate article shall be used for each test.

3.6 Resistance to Wet Heat — When tested by the method described in Appendix B:

a) the articles shall not develop cracks, nor shall they show signs of surface marking or of any other defect that will impair their serviceability or appearance,

b) the internal volume of the articles shall not be reduced by more than 4 percent of the initial value, and

c) it shall not be possible to insert a 0·375-mm feeler gauge at any point between the feet or base of the articles and a flat surface when the articles are placed as normally used on the flat surface and held firmly in place by exerting light pressure with one finger at the centre of the base.

3.7 Resistance to Dry Heat — When tested by the method described in Appendix C, the requirements specified in **3.6**(a) to **3.6**(c) shall be satisfied.

3.8 Resistance to Staining — The tableware shall also pass the test prescribed in Appendix D.

3.9 Warping — When the articles are tested by the method described below after having been subjected successively to the tests specified in **3.6** and **3.7**, it shall not be possible to insert a 0·375-mm feeler gauge at any point between the feet or base of the articles and a flat surface:

> Place the article as normally used on a flat surface and hold firmly in place by exerting light pressure with one finger at the centre of the base. Introduce a 0·375-mm feeler gauge at different points between the feet or base of the article and the surface.

4. PACKING AND MARKING

4.1 Packing — The tableware shall be packed in well-closed containers or as agreed to between the purchaser and the supplier. The manufacturer of the ware shall also supply a leafleat containing his recommendations to the user regarding safe use and cleaning of the ware such as avoidance of use of abrasive scouring powders.

4.2 Marking — The container shall be securely closed and legibly marked with the following information:

a) Manufacturer's name and recognized trade-mark, if any;
b) Name of the tableware;
c) Colour of the tableware; and
d) Batch number.

4.2.1 The containers may also be marked the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 For the purpose of ascertaining conformity of a lot to this specification, the scale of sampling and criteria for conformity shall be as given in Appendix E.

6. TEST METHODS

6.1 The tests shall be conducted in accordance with the methods prescribed in **3.5** to **3.8**. The tests may be carried out in any order, except that the test for warping shall be carried out last.

APPENDIX A

(*Clause* 3.5)

CURE TEST

A-1. DYE TEST

A-1.1 Procedure — The article shall be immersed for 10 minutes in boiling 0·01 percent aqueous solution of Rhodamine B. Where the colour of the article masks the colour of the dye, boiling 0·01 percent aqueous solution of methylene blue shall be used. The article shall then be removed from the solution, washed with hot water, wiped with a cloth soaked in denatured spirit, rinsed and dried. Its surface shall then be inspected for staining.

A-2. SULPHURIC ACID TEST

A-2.1 Apparatus and Reagents

A-2.1.1 *Sulphuric Acid Solution* — containing 4·45 ml of concentrated sulphuric acid in 1 000 ml of water.

A-2.1.2 *Porcelain Enamelled or Stainless Steel Pail* — with cover, of about 2 000 to 3 000 ml capacity. Enamelled ware shall not be used if the inside surface is chipped exposing bare metal.

A-2.1.3 *Heater, Preferably a Gas Burner* — of about 100 to 125 mm diameter. In any event, it should have sufficient capacity to keep the acid solution boiling fairly vigorously.

A-2.2 Procedure — The entire article shall be tested except that where this is impracticable a total area of not less than 130 cm^2 may be used. A fresh portion of sulphuric acid solution shall be heated to boiling in a covered container. The test samples should be kept separated during boiling so that the acid bath has free access to all surfaces. The test samples shall be removed after 10 minutes ± 5 seconds, rinsed in cold water, dried in air for 15 to 20 minutes and then inspected for compliance with **3.5.2**.

APPENDIX B

(*Clause* 3.6)

WET HEAT RESISTANCE TEST

B-1. The article shall be immersed in a tank of water maintained at boiling point for 30 minutes, and then removed and allowed to stand for 1 hour at room temperature. This cycle shall be repeated three times, making a total of four cycles. The article shall then be conditioned for 24 hours at ambient temperature. In case of dispute, the article shall be conditioned for 24 hours at 27 ± 1°C at a relative humidity of 65 ± 2 percent. The article shall thereafter be inspected for compliance with **3.6**.

APPENDIX C

(*Clause* 3.7)

DRY HEAT RESISTANCE TEST

C-1. The article shall be placed in an air-circulating oven at a temperature of 77 ± 2°C for 8 hours, and then removed and allowed to cool. It shall then be conditioned for 24 hours at ambient temperature. In case of dispute, the article shall be conditioned for 24 hours at 27 ± 1°C at a relative humidity of 65 ± 2 percent. The article shall thereafter be inspected for compliance with **3.7**.

APPENDIX D

(*Clause* 3.8)

METHODS OF TEST FOR STAINING

D-1. GENERAL

D-1.0 Depending upon the specific application of the tableware, a selection from the list of the staining agents given below shall be made. The number of staining materials as well as their concentration shall be agreed to between the purchaser and the supplier.

D-2. REAGENTS

D-2.1 Citric Acid Solution — 2 percent.

D-2.2 Coffee — Make a brew by pouring boiling water on to ground coffee (80 g coffee per litre of water) in a hot vessel, stirring occasionally and decanting from the coffee settled at the bottom after infusion for 5 minutes.

D-2.3 Cooking Fat — Any cooking oil or hydrogenated fat with ground turmeric powder; 1 percent (*m/v*).

D-2.4 Milk or Butter Milk

D-2.5 Tea — Infusion made by pouring boiling water on to tea (9 g of tea/litre of water) in a hot vessel, stirring occasionally and decanting from the leaves after infusion for 5 minutes.

D-3.0 PROCEDURE

D-3.1 Apply the test solution on the test surface by pouring and expose the surface to the test solution for 30 minutes. The test solution shall be at 30°C for citric acid and at 60°C in all other cases. Wipe the surface with a clean bleached cloth and observe the surface for any stain. The material shall be deemed to have failed in the test if any visible stain is left on the surface.

APPENDIX E

(*Clause* 5.1)

SAMPLING OF MELAMINE PLASTIC TABLEWARE

E-1. SCALE OF SAMPLING

E-1.1 Lot — In a single consignment, all the melamine plastic tableware articles of identical description, produced under relatively similar conditions of manufacture, such as the same batch of production and the same batch of raw material, shall constitute a lot.

E-1.2 Samples shall be selected and examined for each lot separately to ascertain conformity of the lot to the requirements of this specification.

E-1.3 Number of Samples — From each lot, 17 articles shall be selected for carrying out various tests specified in this standard with a view to ascertaining conformity of the lot to the requirements of this standard.

E-1.4 The sample tableware shall be selected at random from the lot. If the articles in the lot are packed in different boxes, about 10 percent of the boxes, subject to a minimum of 2, shall be chosen at random and from each box so chosen, approximately equal number of articles shall be taken at random so as to make up 17 in all.

E-1.4.1 In order to ensure the randomness of selection, use shall be made of random number tables (*see* IS : 4905-1968*).

E-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

E-2.1 All test samples selected in **D-1** shall be examined for the requirements specified in **3.2** to **3.4.3**.

E-2.1.1 The lot shall be considered acceptable in respect of these requirements if each of the 17 test samples individually satisfies each of these requirements.

E-2.2 If the lot has been declared acceptable in **E-2.1.1**, then out of the 17 test samples, 5 test samples shall be taken at random. Each of these 5 test samples shall be tested for requirements specified in **3.6**, **3.7** and **3.8**.

E-2.2.1 The lot shall be considered acceptable in respect of these requirements if each of the 5 test samples individually meets all these requirements.

E-2.3 If the lot has been found acceptable in **E-2.2.1**, the remaining two test samples shall be subjected to cure test specified in **3.5**.

E-2.3.1 The lot shall be declared to conform to the requirements of this standard if both the test samples pass the cure test.

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*Methods for random sampling.

(*Continued from page* 2)

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2